WHAT IS CLAIMED IS:

1. A pump comprising:
an actuator formed of a magnetostrictive material susceptible to changes in physical dimensions in the presence of a magnetic field;
first and second pumping chambers coupled to said magnetostrictive element to vary in volume as said magnetostrictive element changes shape.

2. The pump of claim **1**, wherein said first and second pumping chambers are driven by opposite ends of said magnetostrictive element, to change volume in phase with each other.

3. The pump of claim **2**, wherein said magnetostrictive element has a lengthwise extent, and said first and second pumping chambers are driven by opposite ends of said element at opposite ends of said lengthwise extent.

4. The pump of claim **3**, wherein said pumping first and second chambers are located at opposing ends of said lengthwise extent.

5. The pump of claim **1**, wherein said first and second pumping chambers are driven by said magnetostrictive element to change volume in opposing phase with each other, so that one chamber has a maximum volume as the other has a minimum volume.

6. The pump of claim **5**, further comprising a third pumping chamber, driven by said magnetostrictive element to pump in phase with one of said first and second pumping chambers.

7. A pump comprising:

a housing defining a cylindrical cavity;
a cylindrical actuator formed of magnetostrictive material, within said housing and coaxial therewith;
first and second pumping chambers within said housing at opposite ends of a lengthwise extent of said magnetostrictive element, each of said pumping chambers mechanically coupled to said actuator, to compress as said actuator extends in length.

8. The pump of claim **7**, wherein fluid in each of said first and second pumping chambers is displaced by a lengthwise extension of said actuator.

9. The pump of claim **8**, further comprising a third chamber extending axially along a length of said actuator, fluid in said third chamber displaced by a radial expansion of said actuator.

10. The pump of claim **9**, wherein inlets of said first, second, and third pumping chambers are fluidly coupled.

11. The pump of claim **10**, wherein outlets of said first, second, and third pumping chambers are fluidly coupled.

12. A pumping assembly, comprising a plurality of pumps in accordance with claim **1**, wherein inputs and outputs of said plurality of pumps are interconnected in parallel.

13. The pumping assembly of claim **12**, wherein each of said plurality of pumps is driven out of phase with each other one of said plurality of pumps.

14. The pumping assembly of claim **13**, comprising three pumps.

15. A pumping assembly, comprising a plurality of pumps in accordance with claim 1, wherein inputs and outputs of said plurality of pumps are interconnected in series.

16. A method of pumping fluid using a magnetostrictive element comprising:

applying a magnetic field to a magnetostrictive element to cause lengthwise extension of said element at two opposing ends;
driving a first pumping chamber through said extension of a first end of said two opposing ends;
driving a second pumping chamber through said extension of a second of said two opposing ends, opposite said first end,

wherein said first pumping chamber is driven in phase with said second pumping chamber.

17. The method of claim **16**, further comprising allowing said magnetostrictive element to contract lengthwise, and extend widthwise;
driving a third pumping chamber with said widthwise expansion of said magnetostrictive element.